

Impact of Liquidity on Profitability of Nepalese Commercial Banks

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Abstract

This paper seeks at investigating the relationship between the liquidity and the profitability of commercial banks in Nepal. Ten out of Twenty seven listed commercial banks were involved in the study covering the period from 2013 to 2019. This study is based on the secondary data, which are extracted from Bank Supervision Reports published by Nepal Rastra Bank and annual reports of the selected commercial banks. The liquidity indicators are credit-deposit ratio (CDR), cash-deposit ratio (CADR) and assets quality (AQ), while return on equity (ROE) and return on assets (ROA) are the proxies for profitability. By using Hausman test and thereafter fixed effects approach, the result showed that assets quality (AQ) has negative and significant relationship with return on assets (ROA) whereas it has positive and significant relationship with return on equity (ROE). Cash-deposit ratio (CADR) has positive and insignificant relationship with return on assets (ROA) and return on equity (ROE). However, the study reveals that credit-deposit (CDR) has positive but insignificant relationship with ROA and has negative and insignificant relationship with return on equity (ROE).

Keywords: *Liquidity, Profitability, Commercial banks, Return on Assets, Return on equity.*

Date of Submission: 01-09-2020

Date of Acceptance: 16-09-2020

I. Introduction

Profitability and liquidity are the primary variables used by the banks to gauge its performance. Liquidity may be defined as the assets or securities which can be without difficulty convertible into cash. Lack of liquidity is frequently one of the first symptoms that a financial institution is in extreme monetary hassle. Liquidity plays a role in figuring out the income level of the corporation, and maintaining liquidity is the important thing factor whether it is involved in the customer convenience and satisfaction. The liquidity in the commercial bank represents the ability to fund its obligations by the contractor at the time of maturity, which includes lending and investment commitments, withdrawals, deposits, and accrued liabilities (Ali & Jameel, 2019). Balanced liquidity stage is vital for the effectiveness and profitability of a firm. Consequently, banking sector want to decide the top of the line stage of the liquidity to be able to make sure high profitability. Liquidity requirement of a firm depends on the peculiar nature of the firm and there is no specific rule on determining the optimal level of liquidity that a firm can maintain in order to ensure positive impact on its profitability (Owolabi & Obida, 2012). Liquidity need to neither be too low nor too excessive. Instead, it needs to maintain a reasonable stage. The liquidity role of financial institution is very important to hold the general public faith upon banks. There is a need to invest the excess of liquidity available at the banks, in a various aspects of investments in order to increase the banks' profitability and to get benefits from the time value of the available money (Alshatti, 2015).

Profitability suggests the capability of the company in earning income on its property. Profitability is defined as an ability to make profit from all the business activities of an enterprise (Owolabi & Obida, 2012). The simple intention of any company is to generate and to beautify the income of the company, so it is compulsory to utilize its assets successfully. Profitability is a degree of firm's performance, which represents potential of a financial institution to generate revenue in excess of value, when it comes to the financial institution's capital base. The profitability measures the monetary success of the company. Bank profitability is an important ingredient of financial development, its relevance spans through banking firm performance to macroeconomic stability. At the firm level, a higher return to a large extent reduces bank fragility. At the macro level, increased profitability makes for a sustainable banking sector that can finance economic growth and development (Osuagwu, 2014). A worthwhile and sturdy banking enterprise has more capacity to stand adverse shocks and take lively element in financial stability. Furthermore, profitability is a reflection of how banks are operating under a given environment. More precisely, it is a mirror image of quality of a bank's management and the shareholder's behavior as well as the bank's risk management capabilities (Aburime, 2008)

Banks are required to maintain a sizeable position in liquid property, while on the other hand they are required to be worthwhile to be sustainable. Almost, profitability and liquidity are effective signs of the company health and overall performance of not only the banking sectors, but all profit-oriented institution. These performance signs are very vital to the shareholders and depositors who are principal publics of financial institutions. As the shareholders are interested by the profitability stage, the depositors are concerned with liquidity role which determines a bank's capability to reply to the withdrawal needs which can be generally on demand or on a quick notice. Banking being a crucial quarter of economic gadget of Nepal, the study on performance of Banking sector and evaluation of determinants of profitability remain as a prudent area of research on financial system. Therefore, the study aims to examine how liquidity influences the profitability of Commercial Banks of Nepal in order to offer insight for improving higher asset and legal responsibility control of banks in Nepal.

II. Theoretical Framework

Liquidity management and profitability in industrial banks are serious issues inside the operations of Commercial banks and of which data on them are severely hoarded. Shrestha (2018) examined liquidity management and profitability of commercial banks in Nepal for the period from 2012-2016. Findings of the study reveal that liquidity does not have its significant impact on profitability in Nepalese commercial banks. Ally (2014) by employing the fixed effects regression model on a panel data obtained from 23 banks from 2009-2013, the empirical results show that bank-specific factors (that are affected by bank- level management) significantly affects bank's profitability in Tanzania.

Mishra & Pradhan (2019) have used Cash-Deposit Ratio (CDR), Credit-Deposit Ratio (CRDR) and Investment-Deposit Ratio (IDR) as independent variables to denote the liquidity management of the banks, while Return on Assets (ROA) and Return on Equity (ROE) have been used as dependent variables for the profitability of the banks. Result reveals that there is a significant negative effect of CDR and IDR on ROA and found that there is no significant relationship between banks' profitability and liquidity taking all the variables into consideration taking sample 10 private sector banks for the period from 2013 to 2017.

Shrestha (2012) in his investigation Impact of Liquidity on Profitability of Commercial Banks in Nepal taking 8 commercial banks sample established in and before 1995 for the period between 2003/04 and 2010/11 stated that the banks' 'NRB to deposit ratio' and 'Cash-vault to deposit ratio' have a positive, significant impact on profitability in Nepal. It also has reported no significant impact of 'Liquid fund to deposit ratio,' 'Cash and bank balance to deposit ratio,' and 'Liquid fund to current liability ratio' on profitability.

Khan & Ali (2016) conducted correlation and regression analysis, and the result revealed that there is a significant positive relationship between liquidity with profitability of the banks. Secondary data was used for analysis which was extracted from the last five years (2008-2014) annual accounts of Habib Bank Limited. Cucinelli (2013) used panel data of 575 listed and non-listed Eurozone banks using OLS regression model, found that there is no significant association between liquidity and probability of default in the long term. Rasul (2013) have found that Cash & due from banks to total deposits is insignificant with ROE, but significant with ROA taking samples from five Islamic banks for the period of 2001 to 2011.

Alshatti (2015) revealed there is an effect of the liquidity management on profitability in the Jordanian commercial banks as measured by ROE or ROA, taking sample of 13 banks from time period of 2005–2012 and found that the increase in quick ratio and the investment ratio affect profitability positively. Lartey, Antwi, & Boadi (2013) Narrated Weak positive relationship between Profitability and Liquidity. The profitability indicator used in this study was return on asset (ROA), while the liquidity indicator used was temporary investment ratio (TIR). Sample comprised of seven out of nine banks listed on the Ghana Stock Exchange spanning 2005-2010.

Khasharmeh (2018) conducted a study to examine the impact of liquidity on Islamic banks profitability during the years over the period of 2010 to 2015 by taking sample of six Islamic banks. The results of the study show that cash & due from banks to total deposits CDTD and investment to total assets INVSTD are correlated positively with ROE. In addition, cash & due from banks to total deposits CDTD, investment to total assets INVSTA indicate a negative correlation with ROE.

Rijal (2019) conducted research to explore Impact of Liquidity on Profitability of Nepalese Commercial Banks taking sample of 8 commercial banks covering the period from 2011-2017. The result showed that credit to deposit, assets quality and liquidity ratio are significant and positive with net interest margin whereas only credit to deposit ratio is significant and positive to return on assets.

Gnawali (2018) found that there is a negative impact of non-performing loan on return on assets in context of Nepalese government banks. Similarly, non-performing loan to total loan (NPLTL) have negative impact on firm profitability i.e. ROE. Jha & Hui (2012) found that there is negative relationship of non-

performing loan with return on assets. Similarly, there is negative relationship of nonperforming loan, with return on equity (ROE).

Identification of variables

Dependent variables

Under this study banks profitability is considered as dependent variable. There are numerous measures of bank performance and profitability is one element of banks performance. Profitability may also be measured using numerous indicators that consist of a return on assets (ROA), return on equity (ROE), earnings per share (EPS), net interest margin (NIM) , and so forth. Two important ratios return on assets (ROA) and return on equity (ROE) are used in assessing the bank profitability.

Independent variables

Under this study Liquidity management is taken as independent variable. The variables like credit-deposit ratio (CDR), cash-deposit ratio (CADR) and Assets Quality (AQ) are used as measure of liquidity.

Credit-Deposit Ratio (CDR) - CDR is the ratio of outstanding credit to aggregate deposit levels of banks (Mishra & Pradhan, 2019). A high CDR indicates two things, firstly the bank is issuing out more of its deposits in the form of interest bearing loans; secondly the bank generates more income (Rengasamy, 2014). Alternatively a very low ratio means bank is at low risk, on the same time it is not using assets to generate income. According to Shrestha (2018) there is a significant relationship between Profitability of commercial banks and Credit Deposit Ratio.

Cash-Deposit Ratio (CADR) - CADR means cash held by banks to their aggregate deposits (Mishra & Pradhan, 2019). It is the ratio of how much financial institution lends out of the deposits it has mobilized. It suggests how plenty of a financial institution's funds are being used for lending, the primary banking activity. Higher ratio shows the higher liquidity position of the banks that gives more useful for new investment opportunity. Shrestha (2012) has reported no significant impact of Cash and bank balance to deposit ratio on profitability.

Assets Quality (AQ) – AQ is the ratio of non- performing loan (NPL) to total loan. Non- performing loans are commonly described as loans in arrear for a long period. NPL has been an important issue for financial institutions and regulators (Rifat, 2016). The higher the NPL ratio, the poorer the credit quality and, therefore, the higher the risk that more loan loss will be charged against income (Kingu, Macha, & Gwahula, 2018).

III. Research Methodology

This study is based on secondary data of 10 commercial banks among 27 commercial banks of Nepal from 2012/13 to 2018/19, leading to a total of 70 observations. The main sources of data include Bank Supervision Reports published by Nepal Rastra Bank and annual reports of the selected commercial banks. The accrued data from this source has been compiled and used with due care as per the requirement of the study. Table 1 shows the number of commercial banks selected for the study along with the study period and number of observations.

Table No. 1:
List of banks along with study period and number of observations

| S.N. | Name of the bank | Study Period | Observation |
|------|--------------------------------------|------------------|-------------|
| 1 | Nepal Bank Limited | 2012/13- 2018/19 | 7 |
| 2 | Agriculture Development Bank Limited | 2012/13- 2018/19 | 7 |
| 3 | Everest Bank Limited | 2012/13- 2018/19 | 7 |
| 4 | Standard Chartered Bank Limited | 2012/13- 2018/19 | 7 |
| 5 | Himalayan Bank Limited | 2012/13- 2018/19 | 7 |
| 6 | Nepal SBI Bank Limited | 2012/13- 2018/19 | 7 |
| 7 | NABIL Bank Limited | 2012/13- 2018/19 | 7 |
| 8 | Nepal Bangladesh Bank Limited | 2012/13- 2018/19 | 7 |
| 9 | Siddhartha Bank Limited | 2012/13- 2018/19 | 7 |
| 10 | Machhapuchchhre Bank Limited | 2012/13- 2018/19 | 7 |
| | Total | - | 70 |

**Table No. 2:
Details of Variables**

| Determinants | Variables | Measurements | References | Notations |
|----------------------|----------------------|--|--------------------------|-----------|
| Profitability | Return on Assets | Ratio of Net Income to Total Assets | (Moussa, 2015) | ROA |
| | Return on Equity | Ratio of Net Income to Total Equity | (Moussa, 2015) | ROE |
| Liquidity Management | Assets Quality | Ratio of Non- Performing Loan to Total Loan. | (Bhattarai, 2015) | AQ |
| | Credit-Deposit Ratio | Ratio of Loan and Advances to Total Deposit | (Abdullah & Jahan, 2014) | CDR |
| | Cash-Deposit Ratio | Ratio of Cash and Bank Balance to Total Deposits | (Shrestha , 2012) | CADR |

Source: Self Elaborations

Based on the dependent variable the equations for the analysis of relation between the variables are listed below:

$$Y = \beta_0 + \beta_1AQ + \beta_2 CDR + \beta_3 CADR + \epsilon$$

Model 1: $ROA = \beta_0 + \beta_1AQ + \beta_2 CDR + \beta_3 CADR + \epsilon$

Model 2: $ROE = \beta_0 + \beta_1AQ + \beta_2 CDR + \beta_3 CADR + \epsilon$

Where, Y= Dependent Variable, β_0 = Intercept of dependent variable,

β_1, β_2 & β_3 = coefficient of independent variables, ϵ = error terms.

Descriptive statistics

The descriptive statistics of dependent variables (ROA and ROE) and independent variables (AQ, CDR and CADR) of the study is shown in Table 3. The descriptive statistics used in this study includes mean, standard deviation, minimum and maximum value of variables and N represent the number of the observation.

**Table No. 3:
Descriptive statistics**

| Variables | N | Mean | Std. Dev. | Minimum | Maximum |
|-----------|----|----------|-----------|----------|----------|
| ROA | 70 | 0.019394 | 0.006138 | 0.004905 | 0.035715 |
| ROE | 70 | 0.232583 | 0.416799 | 0.019842 | 3.613640 |
| AQ | 70 | 0.016491 | 0.015549 | 0.001000 | 0.058500 |
| CDR | 70 | 0.884664 | 0.853943 | 0.489187 | 7.865723 |
| CADR | 70 | 0.059877 | 0.060668 | 0.005471 | 0.472166 |

Table 3 present the descriptive statistics of Nepalese commercial bank. The study period is 2013 to 2019 associated with 10 commercial banks. The average value of ROA of Nepalese commercial bank is 0.019394 with the standard deviation of 0.006138 and the minimum and maximum range from 0.004905 to 0.035715. Similarly the average of ROE is 0.232583 with the standard deviation of 0.416799 but it has minimum value 0.019842 and maximum value 3.613640. The AQ has average value of 0.016491 with the standard deviation of 0.015549 and the minimum and maximum range from 0.001000 to 0.058500. The CDR has minimum value of 0.489187 to maximum 7.865723 with a mean of 0.884664 and standard deviation of 0.853943. Similarly, the average value of CADR is 0.059877 with the standard deviation of 0.060668, the maximum value is 0.472166 and minimum value is 0.005471.

Correlation Analysis

The correlation between different measures of liquidity management and profitability of Nepalese commercial banks is presented in Table 4.

**Table No. 4:
Correlation coefficients between Dependent and Independent Variable**

| Variables | ROA | ROE | AQ | CDR | CADR |
|-----------|-----------|-----------|-----------|-----------|-----------|
| ROA | 1.000000 | -0.119504 | 0.050850 | 0.113844 | 0.188373 |
| ROE | -0.119504 | 1.000000 | 0.271233 | -0.059074 | -0.019809 |
| AQ | 0.050850 | 0.271233 | 1.000000 | 0.163548 | -0.121267 |
| CDR | 0.113844 | -0.059074 | 0.163548 | 1.000000 | 0.034005 |
| CADR | 0.188373 | -0.019809 | -0.121267 | 0.034005 | 1.000000 |

Correlation result in table 4 shows that ROA has positive correlation with AQ, CDR and CADR. ROE has positive correlation of 0.271233 with AQ. However, the correlations between ROE and CDR have negative correlation of -0.059074. Further, the correlation is found to be negative for CADR with ROE i.e. -0.019809.

Correlated Random Effects- Hausman Test

This study deals with panel data, panel data deals with samples of the same cross sectional units observed at multiple point of time. Generally there are 3 forms of models: Pooled OLS regression model, Random effect model and fixed effect model.

Hausman test is used to test which model is appropriate for the study. Pooled OLS regression model assumes all organization used in study are same or have same characteristics in order to overcome that limitation fixed and random effect model selection is done. To determine on whether to use fixed effects or random effects approach, Hausman test is conducted as pointed out by (Greene, 2008). The results are as shown in the Table 5 and Table 6.

Setting up hypothesis:

Null hypothesis: Random effect model is appropriate

Alternative hypothesis: Fixed effect model is appropriate

**Table No. 5:
Hausman Test for ROA**

| Test cross-section random effects | | | | |
|--|-------------------|--------------|------------|--------|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. | |
| Cross-section random | 9.536547 | 3 | 0.0229 | |
| Cross-section random effects test comparisons: | | | | |
| Variable | Fixed | Random | Var(Diff.) | Prob. |
| AQ | -0.182768 | -0.061277 | 0.003717 | 0.0463 |
| CDR | 0.001114 | 0.001167 | 0.000000 | 0.7083 |
| CADR | 0.007787 | 0.011893 | 0.000005 | 0.0586 |

**Table No. 6:
Hausman Test for ROE**

| Test cross-section random effects | | | | |
|--|-------------------|--------------|------------|--------|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. | |
| Cross-section random | 10.449739 | 3 | 0.0151 | |
| Cross-section random effects test comparisons: | | | | |
| Variable | Fixed | Random | Var(Diff.) | Prob. |
| AQ | 15.265823 | 7.803475 | 45.751008 | 0.2699 |
| CDR | -0.083611 | -0.052389 | 0.000386 | 0.1121 |
| CADR | 0.049700 | 0.131514 | 0.124563 | 0.8167 |

According to this test, if the final result is less than 0.05, one has to use fixed effects approach; otherwise one has to use random effects approach. In this case, the final result from table 5 & 6 is 0.0229 and 0.0151 (which is less than 0.05) which means we cannot accept null hypothesis, so we accept alternative hypothesis. Thus the appropriate approach in analysis of this panel dataset is fixed effects approach.

Fixed Effects Analysis

In order to tests the statistical significance and strength of the result, fixed effects models has been used. Table 7 and 8 presents the fixed effects result for the dependent variable and independent variables.

**Table No. 7:
Fixed Effects Analysis of ROA**

| Dependent Variable: ROA Method: Panel Least Squares Sample: 2013 2019 Periods included: 7 Cross-sections included: 10 Total panel (balanced) observations: 70 | | | | |
|--|-------------|-----------------------|-------------|-----------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 0.020956 | 0.001884 | 11.12208 | 0.0000 |
| AQ | -0.182768 | 0.085845 | -2.129049 | 0.0376 |
| CDR | 0.001114 | 0.000695 | 1.602499 | 0.1146 |
| CADR | 0.007787 | 0.010056 | 0.774371 | 0.4419 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| R-squared | 0.536950 | Mean dependent var | | 0.019394 |
| Adjusted R-squared | 0.439465 | S.D. dependent var | | 0.006138 |
| S.E. of regression | 0.004595 | Akaike info criterion | | -7.761507 |
| Sum squared resid | 0.001204 | Schwarz criterion | | -7.343929 |
| Log likelihood | 284.6527 | Hannan-Quinn criter. | | -7.595640 |
| F-statistic | 5.508061 | Durbin-Watson stat | | 1.898316 |
| Prob(F-statistic) | 0.000004 | | | |

Prob value in table shows individual level of statistically significant, prob value should be less than 0.05 to be statistically significant. Whereas Prob(F-statistic) tells about overall models significant, that should also be less than 0.05.

$$ROA = 0.020956 - 0.182768AQ + 0.001114CDR + 0.007787CADR$$

The result of fixed effect model for ROA as dependent variable shows that r squared is 0.5369 or 53.69% which tells 53.69% of model is explained by independent variables (AQ, CDR and CADR) and remaining by other variables. It means that by knowing these independent variables return on assets of commercial banks can be predicted.

Prob(F-statistic) is 0.000004 which is less than 0.05, which tells model is statistically significant. AQ has negative and significant relationship with ROA which means they have inverse relationship. This means that 1 % increase in AQ results to -0.1827 point decrease in ROA. Further this analysis shows that CADR & CDR has positive but insignificant relationship with ROA.

**Table No. 8:
Fixed Effects Analysis of ROE**

| Dependent Variable: ROE Method: Panel Least Squares Sample: 2013 2019 Periods included: 7 Cross-sections included: 10 Total panel (balanced) observations: 70 | | | | |
|--|-------------|------------|-------------|--------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 0.051819 | 0.163891 | 0.316181 | 0.7530 |
| AQ | 15.26582 | 7.467166 | 2.044393 | 0.0455 |
| CDR | -0.083611 | 0.060490 | -1.382233 | 0.1723 |
| CADR | 0.049700 | 0.874680 | 0.056821 | 0.9549 |
| Effects Specification | | | | |

| | | | |
|---------------------------------------|-----------|-----------------------|----------|
| Cross-section fixed (dummy variables) | | | |
| R-squared | 0.240170 | Mean dependent var | 0.232583 |
| Adjusted R-squared | 0.080205 | S.D. dependent var | 0.416799 |
| S.E. of regression | 0.399735 | Akaike info criterion | 1.169956 |
| Sum squared resid | 9.107932 | Schwarz criterion | 1.587534 |
| Log likelihood | -27.94846 | Hannan-Quinn criter. | 1.335823 |
| F-statistic | 1.501395 | Durbin-Watson stat | 2.199082 |
| Prob(F-statistic) | 0.150668 | | |

The result of fixed effect model of ROE as dependent variable shows that the r squared is 24.017%, which tells that 24.0175 of model is explained by independent variables and remaining percent by other variables. It means that by knowing these independent variables return on equity of commercial banks can be predicted.

Prob(f-statistic) is 0.1506 which is greater than 0.05 , which tells model is not statistically significant.

It is found that the coefficients of the regressors for the independent variable AQ is positive, showing that there is a positive and significant relationship with ROE. This indicates that increase in assets quality (AQ) leads to increase in return on equity (ROE).

In addition, the two-tail p-values for both explanatory variables CDR and CADR are greater than 0.05, again suggesting that the explanatory variables do not have significant influence on the dependent variable; hence there is no significant relationship between ROE and independent variables i.e. CDR and CADR.

IV. Results and Conclusion

The basic goal of this study is to explore liquidity management impact on profitability in the commercial banking sector of Nepal. The data is taken from Bank Supervision Reports published by Nepal Rastra Bank and annual reports of ten banks from 2013-2019. The data is analyzed by using Correlation and Fixed effect model run through E-views 8.

The result reveals that assets quality (AQ) has negative and significant relationship with return on assets (ROA) which means they have inverse relationship. Whereas assets quality (AQ) has positive and significant relationship banks profitability when it is analyzed by banks profitability determinants return on equity (ROE). This indicates that increase in assets quality (AQ) leads to increase in return on equity (ROE). i.e. increase in these liquidity ratios boosts the bank profitability and vice-versa.

The findings of such study clarify that cash-deposit ratio (CADR) has positive and insignificant relationship with banks profitability when it is analyzed by banks profitability determinants return on assets (ROA) and return on equity (ROE). The finding indicates that credit-deposit (CDR) has positive but insignificant relationship with ROA. However credit-deposit (CDR) has negative and insignificant relationship with return on equity (ROE). This reveals that profitability ratio ROE has no relationship with those liquidity ratios.

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Ms. Pooja Khatri. "Impact of Liquidity on Profitability of Nepalese Commercial Banks." *IOSR Journal of Economics and Finance (IOSR-JEF)*, 11(5), 2020, pp. 26-33.